**Week 21 RISC and CISC**

Complex Instruction Set Computing (CISC)

And

Reduced Instruction Set Computing (RISC)

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| CISC | RISC |
| Used in laptops and desktop computers, made by Intel or AMD | Used in smartphones and tablets, based around ARM processor |
| Has more complex hardware | Has simpler hardware |
| Multiple machine cycles per instruction | Single machine cycle per instruction |
| Physically larger in size and requires more silicon to make thus more expensive | Smaller in size as less complex circuit required, less silicon needed to make thus cheaper |
| Greater energy consumption | Lower energy consumption |
| **More intensive tasks will do better with this architecture** | **Runs at lower clock speed, but can often perform simpler tasks more quickly** |
| **Many ways to address memory** | **Fewer ways to address memory** |

**CISC processor**

With CISC instruction set will have many known instructions (e.g., 80-100) and these will be complex

In CISC processors, the actual hardware will be built to automate this instruction and so will LOAD the values, MULTIPLY them and STORE the result in one operation (which may take several clock cycles).

Advantages

-Because complex instruction (e.g., multiply) is known to the CPU, it is easy for a compiler to convert a high-level language multiply statement into the appropriate assembly language instruction.

-Because it is just one instruction (which may represent several steps), it requires little memory to be stored.

**RISC processor**

This type of instruction set has a much smaller number of known instructions (for example 30-40).

For example, although there may also be an instruction to multiply 2 numbers, in a RISC CPU, this instruction will only represent the multiplication part of the process and not the LOADING and STORING of values.

In RISC processors, the instructions are not complex (they are simple) and so a single RISC instruction will not automate all other required steps such as LOAD and STORE.

As a result, in RISC, more instructions are required to perform a task.